

**REMARKS**

Claims 1-10 were examined and reported in the Office Action. Claims 1-10 are rejected. Claims 1-10 remain.

Applicant requests reconsideration of the application in view of the following remarks.

**I. 35 U.S.C. §102(e)**

It is asserted in the Office Action that claims 1-4, 6, 8, and 9 are rejected under 35 U.S.C. §102(e), as being anticipated by U. S. Patent No. 6,049,614 issued to Kim ("Kim"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.' (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). 'The identical invention must be shown in as complete detail as is contained in the ... claim.' (Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, *i.e.*, identity of terminology is not required. (In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990))."

Applicant's claim 1 contains the limitations of "[a] sender device for sending an encrypted information signal, the device comprising: means for generating chaotic signals comprising a source producing a chaotic signal and provided with a feedback loop comprising means for generating time delay, and a non-linear circuit element, means for producing the encrypted information signal comprising a mixer circuit element to inject an information signal to encrypt the information signal, received on one input, into the chaotic signal propagating in the feedback loop, received on another input, wherein the feedback loop includes means for filter-forming to limit the spectrum of the chaotic signal to one or more spectrum bands."

Applicant's claimed invention proposes an approach of synchronization specific to delay non-linear dynamical systems. Applicant's claimed invention includes a chaos signal generator based on a voltage controlled oscillator operating with a delayed non-linear feedback circuit including a delay line element. Therefore, the chaotic signal is obtained as a function of time is governed by time delay non-linear differential equations.

Kim discloses a chaotic system based on a classical chaotic dynamical system governed by ordinary differential equations (ODE) and does not disclose, teach or suggest "means for generating time delay." It is clearly shown on Kim's Figures 3 - 5 that Kim's dynamical system is governed by ODE and not by time delay non linear differential equations. The "time delay" disclosed in Kim (see Kim, Col. 9, lines 19-34) refers explicitly to a "time delay phase space," which is a mathematical method for reconstructing the phase space of a dynamical system. In particular, Kim's time delay phase space is a signal treatment technique for analyzing the properties of a one-dimensional chaotic scalar signal. Kim's technique consists of representing the signal in a two-dimensional space having coordinates corresponding to the signal  $z(t)$  and to the time delayed same signal. It is clear that Kim's time delay notion is not related to the architecture of the chaos generator itself.

Distinguishable, Applicant's claimed invention refers to a chaos generator with an architecture including a feedback loop having delay line means and, thus, the generated chaos is governed by time delay non linear differential equations.

Further, Kim discloses filtering of a noise signal that is already provided. In contrast, the filtering disclosed in Applicant's claimed invention is inherently integrated in the delay system generating the chaotic signal. Thus, the generated chaotic signal is not filtered any more outside of the feedback loop. In other words, it is the internal filter of the delay chaos generator that partly defines the spectrum of the generated chaotic signal.

Moreover, Kim's communication system, as depicted in figure 13 (see Annexe 1), uses an external signal  $g(t)$  with noise or chaotic characteristics to synchronize the chaotic generator (30) of the transmitter with the chaotic generator (40) of the receiver.

And, in order to send encrypted information, Kim's transmitter adds a chaotic signal  $y(t)$  to the message signal  $m(t)$  and transmits the mixed signal  $m(t)+y(t)$  encrypted to the receiver. It should be noted that the message signal  $m(t)$  is not injected into the feedback loop of the chaotic generator. In other words, Kim adds the message signal  $m(t)$  outside the chaos generation process, thus having important consequences on the decoding technique. Therefore, in order to communicate securely with the receiver, Kim's transmitter needs to send two signals  $g(t)$ . A synchronizing signal and  $m(t)+y(t)$ , an encrypted signal to the receiver.

Distinguishable, as depicted on the drawing of Annexe 2 (corresponding to figures 8a and 9a of Applicant's claimed invention, the sender device communicates securely with the receiver device by sending only one signal that acts both as a synchronizing signal and an encrypted signal. Contrary to Kim, the message signal  $s(t)$  is injected into the feedback loop of the chaos generator to produce a synchronizing chaotic signal  $c(t)$  which is then added to the message signal producing a synchronizing encrypted signal  $s(t)+c(t)$ .

Kim does not teach, disclose or suggest "means for generating chaotic signals comprising a source producing a chaotic signal and provided with a feedback loop comprising means for generating time delay, and a non-linear circuit element, means for producing the encrypted information signal comprising a mixer circuit element to inject an information signal to encrypt the information signal, received on one input, into the chaotic signal propagating in the feedback loop, received on another input, wherein the feedback loop includes means for filter-forming to limit the spectrum of the chaotic signal to one or more spectrum bands."

Therefore, since Kim does not disclose, teach or suggest all of Applicant's claims 1 limitations, Applicant respectfully asserts that a *prima facie* rejection under 35 U.S.C. § 102(e) has not been adequately set forth relative to Kim. Thus, Applicant's claim 1 is not anticipated by Kim. Additionally, the claims that directly or indirectly depend on claim 1, namely claims 2-4, 6, 8 and 9, are also not anticipated by Kim for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §102(e) rejections for claims 1-4, 6, 8, and 9 are respectfully requested.

## II. 35 U.S.C. § 103(a)

A. It is asserted in the Office Action that claim 10 is rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Kim, in view of U. S. Patent No. 5,729,607 issued to DeFries ("DeFries"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." "*All words in a claim must be considered in judging the patentability of that claim against the prior art.*" (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant's claim 10 depends on amended claim 1. Applicant has addressed claim 1 regarding Kim above in section I.

Applicant's claimed invention discloses a system for scrambling an information signal where the information signal is injected into the feedback loop of a chaotic signal generator and influences the dynamics of the transmitter. Therefore, the information signal is involved in the synchronization. Moreover, Applicant's claimed invention uses a unique transmission carrier for the synchronization between the transmitter and the receiver and the transmission of the encrypted information signal.

Applicant's claimed invention concerns the large fraction of chaotic frequencies produced by generators that are unused when transmitted via the transmission carrier as lying outside the payload bandwidth of the information signal. To solve the technical problem, as the information signal is being injected in the feedback loop, band pass filter matching the information signal's frequency band is inserted in the feedback loop before its transmission via the carrier. More particularly, a band pass filter is used having its centre frequency coinciding with the frequency of the information signal. Another solution is a band pass filter that matches the channel characteristics. Therefore, Applicant's claimed invention filters the chaos signal to match the frequency band of the information signal or the transmission carrier characteristics to send a narrow frequency band signal via the transmission carrier.

DeFries discloses a communication system that uses the noise signal that naturally occurs in transmission conduits between a transmitter and a receiver to encode an information signal. DeFries further discloses identifying and using the existing noise sustained structure for transmission coding negates the necessity to filter or change the spectral density profile of the information signal (DeFries, column 15, lines 63-67). DeFries, however, does not teach, disclose or suggest "[a] sender device for sending an encrypted information signal, the device comprising: means for generating chaotic signals comprising a source producing a chaotic signal and provided with a feedback loop comprising means for generating time delay, and a non-linear circuit element, means for producing the encrypted information signal comprising a mixer circuit element to inject an information signal to encrypt the information signal, received on one input, into the chaotic signal propagating in the feedback loop, received on another input, wherein the feedback loop includes means for filter-forming to limit the spectrum of the chaotic signal to one or more spectrum bands."

Therefore, even if Kim were combined with DeFries, the resulting invention would still not include all of Applicant's claimed limitations. And, therefore, there would be no motivation to combine Kim with DeFries.

Neither Kim, DeFries, nor the combination of the two, teach, disclose or suggest the limitations contained in Applicant's claim 1, as listed above. Since neither Kim, DeFries, nor the combination of the two, teach, disclose or suggest all the limitations of

Applicant's claim 1, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's claim 1 is not obvious over Kim in view of DeFries since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends on claim 1, namely claim 10, is also not obvious over Kim in view of DeFries for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claim 10 is respectfully requested.

**B.** It is asserted in the Office Action that claims 5 and 7 are rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Kim, in view of U. S. Patent No. 5,379,346 issued to Pecora ("Pecora"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claims 5 and 7 depend on amended claim 1. Applicant has addressed claim 1 regarding Kim above in sections I and II(A).

Pecora discloses a communication system comprising synchronizable chaotic systems using cascaded transmitters and receivers. Pecora further discloses a system with two transmission carriers between a transmitter and receiver. Additionally, it is an object of Pecora to provide an improved device that relies on wide frequency band synchronized signal. Pecora, however, does not teach, disclose or suggest "[a] sender device for sending an encrypted information signal, the device comprising: means for generating chaotic signals comprising a source producing a chaotic signal and provided with a feedback loop comprising means for generating time delay, and a non-linear circuit element, means for producing the encrypted information signal comprising a mixer circuit element to inject an information signal to encrypt the information signal, received on one input, into the chaotic signal propagating in the feedback loop, received on another input, wherein the feedback loop includes means for filter-forming to limit the spectrum of the chaotic signal to one or more spectrum bands."

Therefore, even if Kim were combined with Pecora the resulting invention would still not teach, disclose or suggest "[a] sender device for sending an encrypted information signal, the device comprising: means for generating chaotic signals comprising a source producing a chaotic signal and provided with a feedback loop

comprising means for generating time delay, and a non-linear circuit element, means for producing the encrypted information signal comprising a mixer circuit element to inject an information signal to encrypt the information signal, received on one input, into the chaotic signal propagating in the feedback loop, received on another input, wherein the feedback loop includes means for filter-forming to limit the spectrum of the chaotic signal to one or more spectrum bands.”

Since neither Kim, Pecora, nor the combination of the two, teach, disclose or suggest all the limitations of Applicant's claim 1, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's claim 1 is not obvious over Kim in view of Pecora since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends on claim 1, namely claims 5 and 7, are also not obvious over Kim in view of Pecora for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 5 and 7 are respectfully requested.

**CONCLUSION**

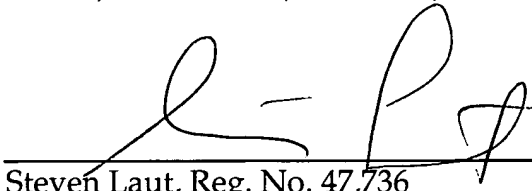
In view of the foregoing, it is believed that all claims now pending, namely 1-10, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

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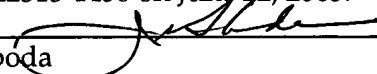
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